

## CLAIMS

Therefore, having thus described the invention, at least the following is claimed:

- 1 1. A method for detecting and correcting for modal dispersion in a multi-mode  
2 fiber optic system having an optical signal coupled into a multi-mode fiber,  
3 comprising:  
4 detecting a plurality of optical signals radiating from an end of the multi-mode  
5 fiber by a multisegment photodetector having different detector regions that detect  
6 different portions of the plurality of optical signals; and  
7 modifying detected signals by the multisegment photodetector to reduce  
8 effects of modal dispersion among the plurality of optical signals.
- 1 2. The method of claim 1, wherein the modifying detected signals by the  
2 multisegment photodetector is performed using weighting factors that adjust the  
3 detected signals.
- 1 3. The method of claim 1, further comprising converting the plurality of optical  
2 signals into at least two electrical signals and modifying at least one signal by  
3 weighting factors to produce a signal that approximates a value of the optical signal  
4 originally coupled into the multi-mode fiber.
- 1 4. The method of claim 1, wherein the modifying detected signals by the  
2 multisegment photodetector is performed by altering bias among the multiple  
3 detection regions as the weighting factor.
- 1 5. The method of claim 1, wherein the modifying detected signals by the  
2 multisegment photodetector is performed using attenuation as the weighting factor.
- 1 6. The method of claim 1, wherein the modifying detected signals by the  
2 multisegment photodetector is performed using amplification as the weighting factor.
- 1 7. The method of claim 1, wherein the modifying detected signals by the  
2 multisegment photodetector is performed using phase shifting as the weighting factor.

1 8. The method of claim 1, wherein the modifying detected signals by the  
2 multisegment photodetector is performed using delay as the weighting factor.

1 9. The method of claim 1, wherein the modifying detected signals by the  
2 multisegment photodetector is performed by arbitrarily selecting the weighting  
3 factors.

1 10. The method of claim 1, wherein the modifying detected signals by the  
2 multisegment photodetector further comprises examining an output of the multi-  
3 segment photodetector and adjusting a weighting factor until the output approximates  
4 a value of the optical signal.

1 11. The method of claim 3, further comprises combining at least two signals  
2 modified together in unique manners to produce an output signal.

1 12. The method of claim 1, wherein detecting a plurality of optical signals  
2 radiating from an end of the multi-mode fiber by a multi-segment photodetector is  
3 performed using the multisegment photodetector having at least two concentric,  
4 coplanar, annular photodetectors.

1 13. The method of claim 1, wherein detecting a plurality of optical signals  
2 radiating from an end of the multi-mode fiber further comprises inserting a diffractive  
3 optical element between the fiber and the multisegment photodetector for modifying  
4 the distribution of optical signals among the plurality of detection regions.

1 14. The method of claim 1, wherein the detecting a plurality of optical signals  
2 radiating from an end of the multi-mode fiber further comprises inserting a reflective  
3 optical elements between the fiber and the multisegment photodetector to modify the  
4 distribution of optical signals among the plurality of detection regions.

1 15. A method for detection and compensation of multimodes produced from a  
2 multimode optical fiber system, comprising:  
3 converting an input electrical signal to an optical signal;  
4 launching an optical signal into a multimode fiber;  
5 positioning a photodetection system at an end of the multimode fiber to  
6 receive a plurality of optical signals exiting the multimode fiber; detecting the  
7 multiple optical signals by multiple detectors of the photodetection system producing  
8 detected electrical signals;  
9 modifying the detected electrical signals; and  
10 adding together the detected electrical signals to generate an output electrical  
11 signal corresponding to the input electrical signal.

1 16. The method of claim 15, further comprising: transmitting the optical signal  
2 using an optical source selected from the group consisting of VCSEL, LED, DFB, and  
3 F-P lasers.

1 17. The method of claim 16, wherein the transmitting comprises transmitting the  
2 optical signal by direct modulation.

1 18. The method of claim 16, wherein the transmitting comprises transmitting the  
2 optical signal by indirect modulation.

1 19. The method of claim 15, further comprising boosting of the optical signal  
2 using optical amplification in any part of the multimode optical fiber system.

- 1 20. The method of claim 15, further comprising transmitting the optical signal at  
2 any combination of wavelengths selected from the group consisting of 850, 1300, and  
3 1550 nm and neighboring wavelengths.
- 1 21. The method of claim 15, further comprising inserting an intervening optical  
2 element between the fiber and photodetection system to alter the distribution optical  
3 light to the plurality of detection zones.
- 1 22. The method of claim 15, wherein modifying the detected optical signals  
2 further comprises introducing a delay to any of the detected optical signals.
- 1 23. The method of claim 15, wherein modifying the detected optical signals  
2 further comprises attenuating any of the detected optical signals.
- 1 24. The method of claim 15, wherein modifying the detected optical signals  
2 further comprises biasing any of the detected optical signals.
- 1 25. The method of claim 15, wherein modifying the detected optical signals  
2 further comprises amplifying any of the detected optical signals.
- 1 26. The method of claim 15, wherein modifying the detected optical signals  
2 further comprises phase shifting any of the detected optical signals.
- 1 27. The method of claim 15, wherein modifying the detected optical signals is  
2 performed using instruments selected from the group consisting of electronic,  
3 semiconductor and mechanically based instruments.
- 1 28. A method for detecting and correcting for dispersion in an optical fiber system,  
2 comprising:  
3 detecting optical signals radiating from an end of an optical fiber by a  
4 multisegment photodetector having a plurality of detection zones for detecting the  
5 optical signals, the detection zones positioned adjacent to one another and arranged in  
6 a coplanar, annular configuration.

1 29. The method of claim 28, further comprising modifying detected signals to  
2 reduce effects of the dispersion among the detected signals.

1 30. The method of claim 28, wherein detecting optical signals radiating from an  
2 end of an optical fiber is performed using a plurality of segments located within the  
3 detection zones having an interdigitated, planar metal-semiconductor-metal structure.

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